Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz	)	GN Docket No. 17-183
	)	

COMMENTS OF DECAWAVE

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Table of Contents

I. INTRODUCTION

Decawave respectfully submits this response to the FCC ("the Commission") in the above mentioned proceeding.

Decawave is a developer and supplier of Impulse-Radio Ultra-Wideband (IR-UWB) semiconductor devices designed to operate in the bands in question, and we appreciate the opportunity to provide these comments to the Commission.

II. COMMENTARY

We recognize that this Notice of Inquiry has been prompted, in a large part, as a result of Wi-Fi equipment manufacturers seeking more spectrum to offer additional service to their users and grow their business. Neither these manufacturers nor the Notice of Inquiry itself have given consideration to the fact that the bands between 3 GHz and 10 GHz are already available for unlicensed usage under FCC PART 15 Subpart C Section 15.250 *Operation of wideband systems within the band 5925-7250 MHz*, and/or under Subpart F – *Ultra-Wideband Operation*, and that there are already many manufactures making and deploying equipment operating under these wideband and ultra-wideband rules.

Decawave is a manufacturer of radio transceiver semi-conductor devices designed to be operated in these bands, and which our customers use to design, manufacture, and deploy such equipment. As such then, we are very concerned that these existing and rapidly expanding deployments will be severely disrupted if new higher-powered unlicensed transmitters are allowed to occupy the spectrum that is now being effectively used by UWB and wideband radios for a variety of useful and critical applications. To date, Decawave alone has shipped over 4 million transceivers, this will rise to more than 10 million by the end of 2018 and to over 100 million by 2020.

One of the key application areas of the current deployments is real-time location systems, which include safety and security applications whose impairment could have serious consequences.

Over 3000 companies have invested in excess of $1bn in R&D over the past few years developing products using IR-UWB modulations with various real-time location use-cases, including:

- Security of infants and geriatrics in a hospital/home setting
- Safety of personnel operating in proximity to machinery
- Guidance/safety of first responders, e.g. firefighters entering smoke filled buildings
- Automotive passive entry systems based on secure proximity detection
- Position based secure access to buildings, and, position based payment systems.
- Security of inmates/staff in a prison setting
- General indoor navigation, autonomous robot guidance, factory automation, smart home.

III. BAND 3.7-4.2 GHz

This band is one of the bands supported by Decawave's semiconductor devices where we have a center frequency of 3993.6 MHz and a programmable transmit pulse shape that gives a transmission 3dB bandwidth that is nominally 499.2 MHz. (For reference our transceiver implements the IEEE 802.15.4 HRP UWB physical layer signaling for which this is channel number 2.) Equipment using this band may operate under FCC PART 15 Subpart F indoors and outdoors in handheld equipment. Devices operating here can achieve longer operating range than those in the higher frequency bands, which makes it suitable for use in challenging environments particularly those that might be encounter by first responders, (in the EU, the rules[1] allow higher power transmissions in this band for such emergency use).

IV. BAND 5.925-7.125 GHz

This band is also supported by Decawave's semiconductor devices where we have a center frequency of 6489.6 MHz and a nominal 3dB bandwidth of 499.2 MHz, (which for reference is IEEE 802.15.4 HRP UWB channel number 5.). This band is especially useful since equipment here may operate under the wideband rules of FCC PART 15 Subpart C Section 15.250, allowing outdoor usage on mobile devices (as well as general indoor usage). Many companies, including our customers and unrelated competitor companies, are manufacturing equipment, and deploying systems using this band, for applications such as sports tracking, robotic control, automotive passive entry, safety of personnel in proximity to machinery, (and the other aforementioned application areas listed in II above).

V. POTENTIAL NEW ENTRANTS

Opening up the bands identified in II and III above, particularly the 5.925-7.125 GHz band, to new unlicensed transmitters with U-NII like power levels should be of concern to the Commission from the point of view of the likely disruption to the unlicensed equipment the Commission has already allowed to operate under FCC PART 15 Subpart C Section 15.250, and/or Subpart F, particularly in light of their application in areas of safety and security whose impairment could have serious consequences.

Ideally, to avoid this disruption, any new entrants would be constrained to the transmit power limits currently allowed by these wideband and ultra-wideband rules. Detect-and-avoid of the deployed devices will be difficult since their maximum transmit level of -41.3 dBm/MHz will in general make them undetectable by typical U-NII radios unless they include specific demodulators for the deployed wideband modulations.

[1] See ECC Recommendation (11)10 on Location Tracking Application for Emergency and Disaster Situations, October 2011.

VI. URGENCY

While the coalitions of companies seeking the opening of the aforementioned bands are saying this is an urgent matter, we would ask the Commission to proceed with caution taking due consideration of the current unlicensed users and applications who should be protected. A number of the coalition companies, whether their Wi-Fi lobby know it or not, are also active in pursing product designs and solutions using IR-UWB for localization services.

VII. CONCLUSIONS

With regards to the general questions in the NOI, we were disappointed that the current unlicensed use of the frequency range between 3.1 and 10.6 GHz appears to have been overlooked by the Commission and the supporting companies.

We believe that the 3.7-4.2 GHz band and most particularly the 5.925 to 7.125 GHz band should not be opened to U-NII usage because of the likely disruption these new transmitters will cause to existing deployed equipment and systems operating unlicensed under FCC PART 15 Subpart C Section 15.250, and/or under Subpart F. Or, any new unlicensed users allowed should also be subject to the -41.3 dBm/MHz power limit. There are thousands of companies who have invested and are investing billions of dollars in the development of UWB and wideband systems. This industry represents substantial employment and revenue generation, both of which are growing rapidly. The utility of these systems, for precision location based services often in security and safety critical applications, must be preserved.

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